

Application No.: 10/076003

Case No.: 57181US002

REMARKS

Claims 1 – 40 have been pending. Claims 1 – 19 and 34 – 38 are being canceled.

Rejections Under 35 U.S.C. § 103

Claims 20 – 22, 25 – 33, and 39 – 40 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,937,272 (Tang) in view of U.S. Patent No. 6,087,196 (Sturm et al.). The rejection is traversed for the following reasons.

Applicants disclose an integrated circuit (IC) comprising a deposition substrate, a patterned first electrode layer formed adjacent the deposition substrate, a patterned organic semiconductor layer formed adjacent the first electrode layer, and a second patterned electrode layer deposited adjacent the organic semiconductor layer, wherein the patterned first electrode layer, the patterned organic semiconductor layer, and the second patterned electrode layer are each defined by a repositionable aperture mask, and wherein one of the patterned first electrode layer and the patterned second electrode layer defines source and drain electrodes, and one of the patterned first electrode layer and the patterned second electrode layer defines a gate electrode.

In simplified terms, Applicants disclose an IC that comprises three patterned layers (a source and drain layer, an organic semiconductor layer, and a gate electrode layer), each of which is defined by a repositionable aperture mask. In other words, Applicants disclose an IC that comprises (1) a patterned source and drain layer defined by a repositionable aperture mask, (2) a patterned organic semiconductor layer defined by a repositionable aperture mask, and (3) a patterned gate electrode layer defined by a repositionable aperture mask.

The Examiner has asserted that Tang discloses an IC having a patterned first electrode layer 62, a patterned organic semiconductor layer (col. 4, line 14; col. 7, lines 2, 26), and a second patterned electrode layer 72, wherein the patterned layer is defined by repositionable aperture mask 112; and that Sturm discloses a TFT having a patterned first electrode 62 and a patterned second electrode, wherein a first electrode layer 62 defines a gate electrode and the second electrode layer 72, 90 defines source and drain (S/D) electrodes. Based upon these assertions, the Examiner has concluded that “it would have been obvious to one skilled in the art

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at the time the invention was made to modify the invention of Tang with the first and second electrodes defining S/D of the TFT.

The Examiner has failed, however, to establish a *prima facie* case of obviousness. According to MPEP Section 2143, a criterion for establishing a *prime facie* case of obviousness is that “the prior art reference . . . must teach or suggest all the claim limitations.” Neither Tang nor Sturm, however, appear to teach or suggest a patterned gate electrode layer defined by a repositionable aperture mask.

Tang discloses a method of forming organic electroluminescent (EL) displays comprising vapor depositing green, blue, and red organic EL medium through an aperture mask (see, for example, claims 1, 5, and 15, and col. 3, line 50, through col. 6, line 15). Tang also discloses an upper electrode 62 and an anode bottom electrode 72. Tang does not appear to teach or suggest a patterned source and drain layer defined by a repositionable aperture mask or a patterned gate electrode layer defined by a repositionable aperture mask. The entire disclosure of patterning using an aperture in Tang appears to be with respect to patterning an EL layer. In fact, Tang does not only appear to not teach or suggest using an aperture mask to electrode layers, Tang does not appear to teach or suggest patterning of electrode layers at all. If the Examiner disagrees, Applicants respectfully request that the Examiner point out the language in Tang which teaches or suggests patterning electrode layers using a repositionable aperture mask.

Because Tang does not teach or suggest a patterned source and drain layer defined by a repositionable aperture mask or a patterned gate electrode layer defined by a repositionable aperture mask, these claim limitations must be either taught or suggested by Sturm in order for the Examiner to have established a *prima facie* case of obviousness. Sturm discloses a method of fabricating organic light emitting diodes (OLEDs) including applying source and drain electrodes by evaporation through shadow masks (see, for example, col. 5, lines 45 – 47). Sturm does not, however, appear to teach or suggest a patterned gate electrode layer defined by a repositionable aperture mask. The only references to a gate electrode layer in Sturm are at col. 6, lines 55 – 56, and in claim 23. (Applicants do not understand the Examiner’s statement that “the second electrode layer 72, 90 defines S/D electrodes of the TFT. It appears that 72 refers to a green organic EL material (see, col. 6, lines 24 – 27), and 90 refers to a polymer island of organic EL material (see, col. 6, lines 32 – 36).) There does not appear to be any disclosure or suggestion

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in Sturm that the gate electrode can be patterned using a repositionable aperture mask. If the Examiner disagrees, Applicants respectfully request that the Examiner point out the language in Sturm which teaches or suggests patterning a gate electrode layer using a repositionable aperture mask.

In addition, neither Tang nor Sturm appear to teach or suggest devices or ICs comprising more than one IC layer patterned by a repositionable aperture mask, or how such patterning would be accomplished. Tang appears to disclose only organic EL medium patterned by a repositionable aperture mask. Sturm appears to disclose only source/drain electrodes patterned by a repositionable aperture mask. Neither reference teaches how to pattern more than one layer with the same IC with a repositionable aperture mask. ICs have a complicated structure. Although ICs typically cover a large area, small feature sizes and precision are required within the IC. Alignment of IC layers is therefore crucial. Neither of the references teach or suggest that alignment of multiple layers patterned with repositionable aperture masks could be achieved. In fact, Sturm states, at column 4, lines 53 – 59, “It was difficult to fabricate devices directly on top of the polymer dots fabricated by ink-jet printing because of the difficulty in aligning a shadow mask for metal cathode formation directly over a polymer dot. Therefore to fabricate test devices the ink-jet printer was operated in a mode to create a continuous sheet of polymer rather than discrete dots.” Sturm also notes that it is difficult to extend aperture mask techniques to large areas (see, for example, column 1, lines 58 – 60). It therefore would not have been obvious to one of skill in the art that multiple patterned layers could be properly aligned using aperture masks.

Furthermore, one skilled in the art would not combine Tang and Sturm as suggested by the Examiner. Tang’s upper and bottom electrodes are part of an OLED. OLED electrodes, which are typically an anode and a cathode, are not the same as transistor electrodes, which are source/drain electrodes and a gate electrode. One skilled in the art would not therefore replace the OLED electrodes of Tang with the transistor electrodes (that is, source/drain and gate electrodes) of Sturm. Applicants presented this argument in their last response, but the Examiner did not address it the outstanding office action.

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For the foregoing reasons, claims 21 – 22 and 25 – 33 are unobvious and patentable over xøøüðüðþ à the combination of Tang and Sturm. Applicants respectfully request that the rejection under § 103(a) be withdrawn.

Concluding Remarks

In view of the above, it is submitted that the application is in condition for allowance. Reconsideration of the application is respectfully requested.

Respectfully submitted,

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